

RUN8 H-Jet polarimeter

1. ONLINE Data check.

Hiromi Okada

April 4th

- ✓ Two correlations (T_R -TOF, θ_R - T_R),
- ✓ Background level, acceptance,
- ✓ A_N & $\varepsilon_{\text{BEAM}}$.

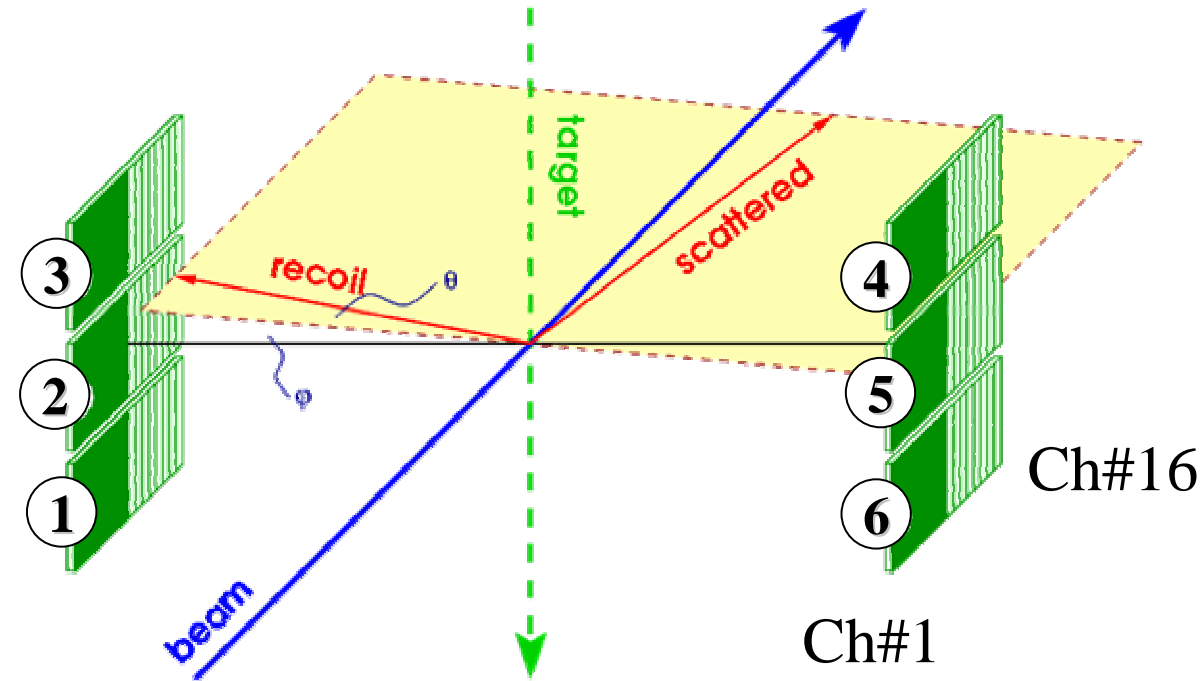
2. ONLINE results of single beam mode.

- ✓ Absolute beam-pol. for every couple of stores!
- ✓ All stuffs are on the web.

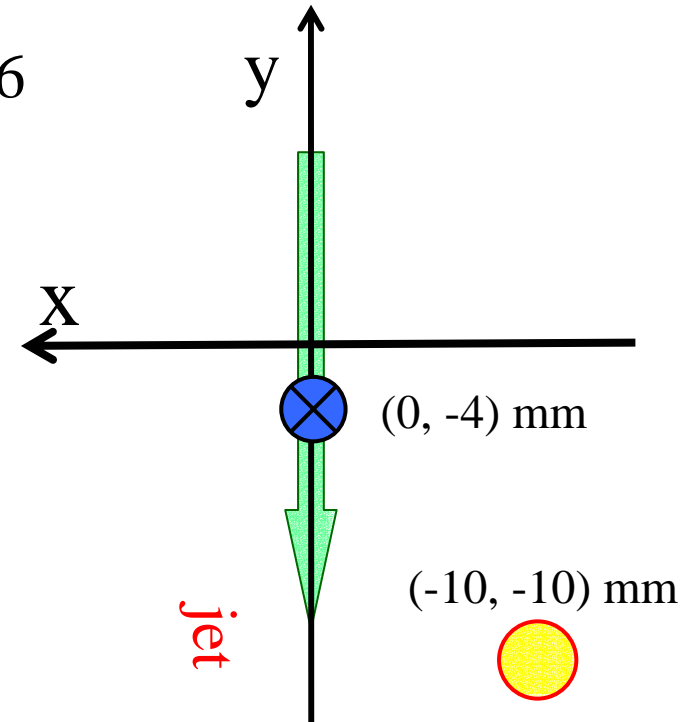
3. Two beams mode commissioning.

4. Next things for the OFFLINE analysis.

Single beam mode Set up



Same as RUN5
and RUN6



Collision point – detector: 80cm

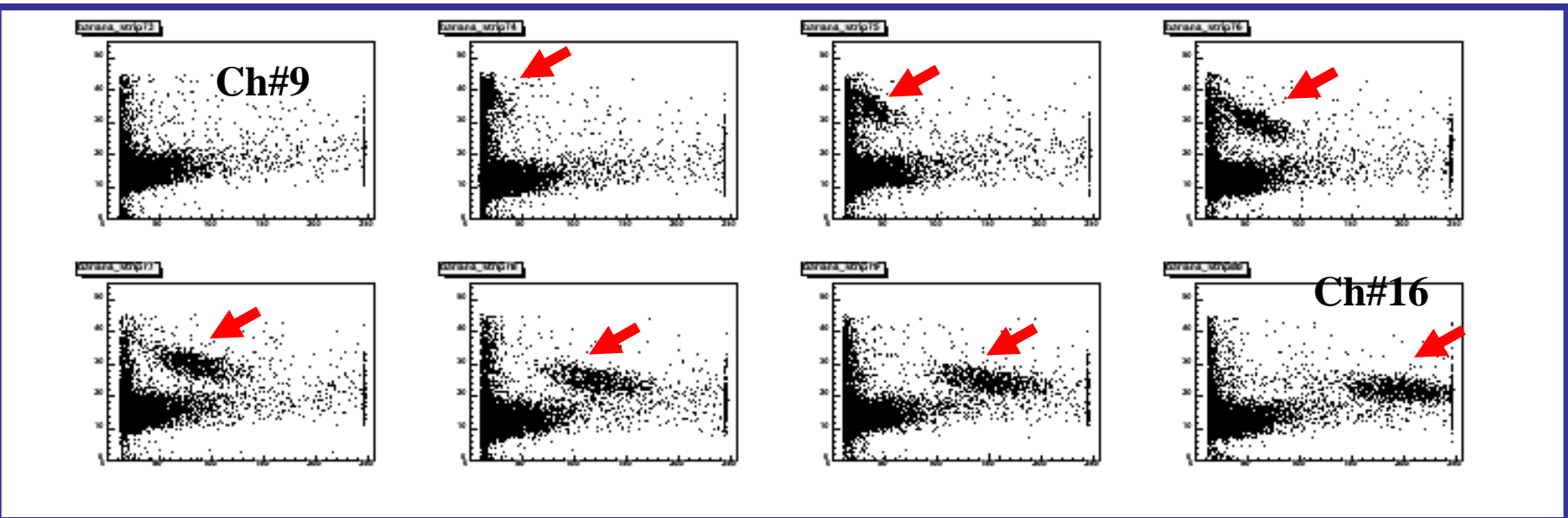
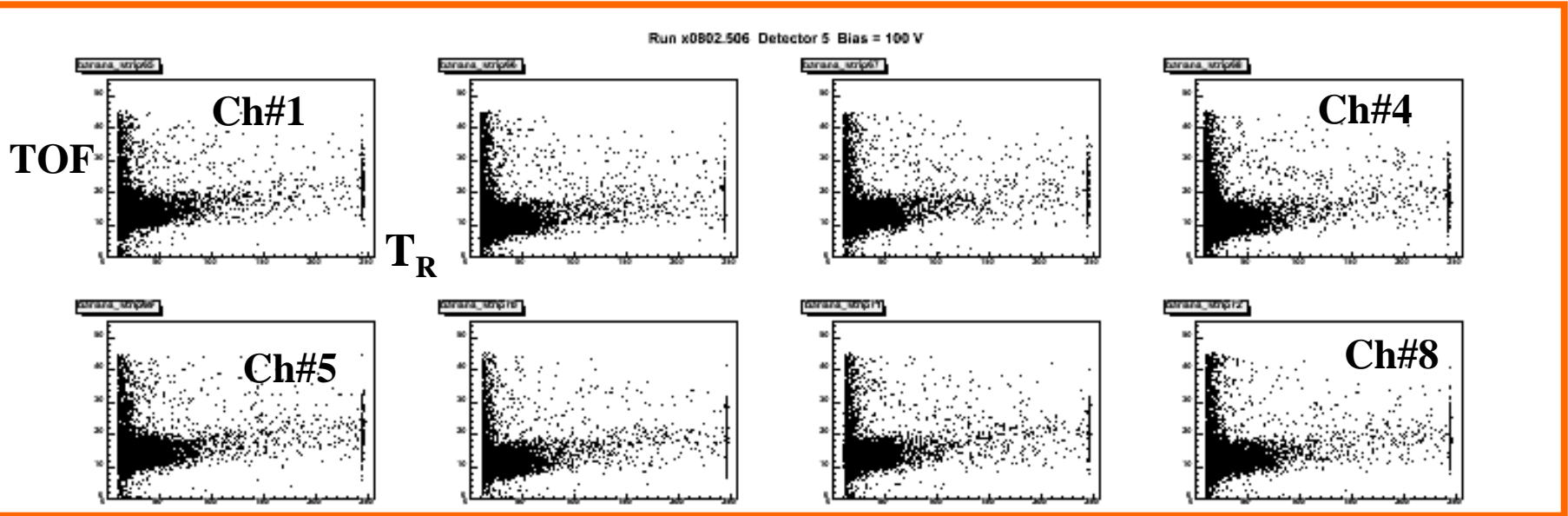
Cover kinetic energy: $0.5 < T_R < 5$ MeV

Energy calibration: 5.486 MeV (Am),

3,183 MeV (Gd)

Energy and TOF correlations from one of the detector

$0.5 < T_R < 5 \text{ MeV}$
 $80 > \text{TOF} > 20 \text{ ns}$



TOF

banana_strip41

Si#3

T_R

banana_strip57

Si#6

Energy and TOF correlations of 6 detectors
(**BLUE side**)

$0.5 < T_R < 5 \text{ MeV}$
 $80 > \text{TOF} > 20 \text{ ns}$

TOF

banana_strip25

Si#2

T_R

banana_strip73

Si#5

Color shows events from 8 different channels.

Recoil particle identification

20 nsec

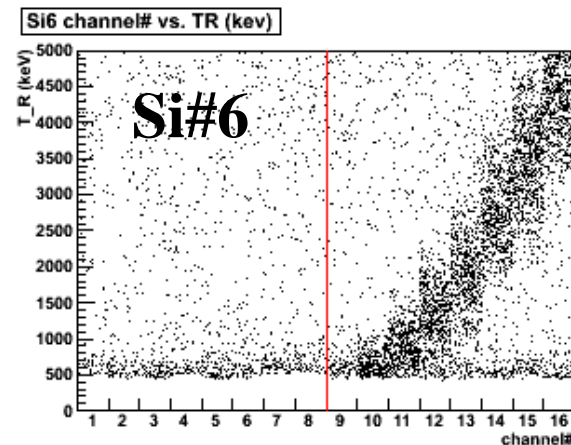
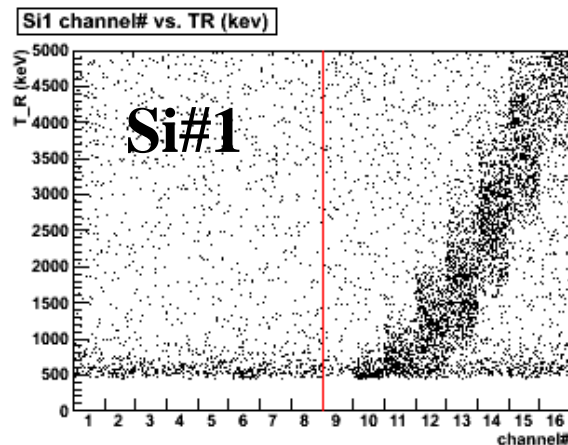
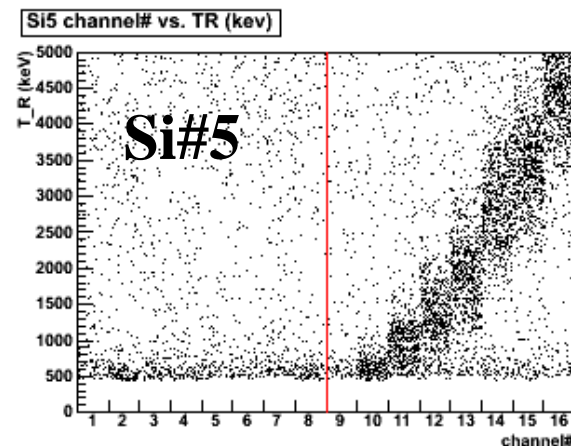
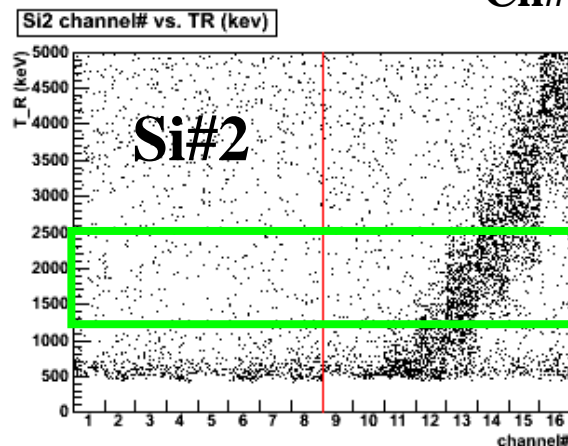
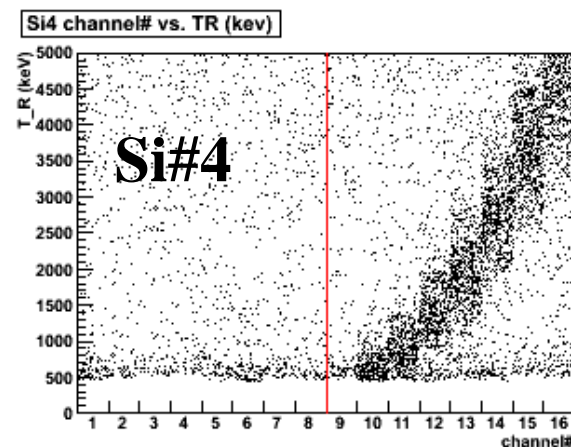
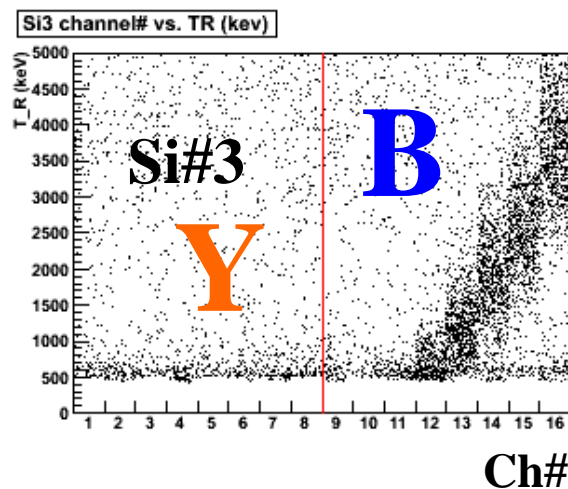
banana_strip09

Si#1

banana_strip89

Si#1

T_R



T_R and ch#
correlation

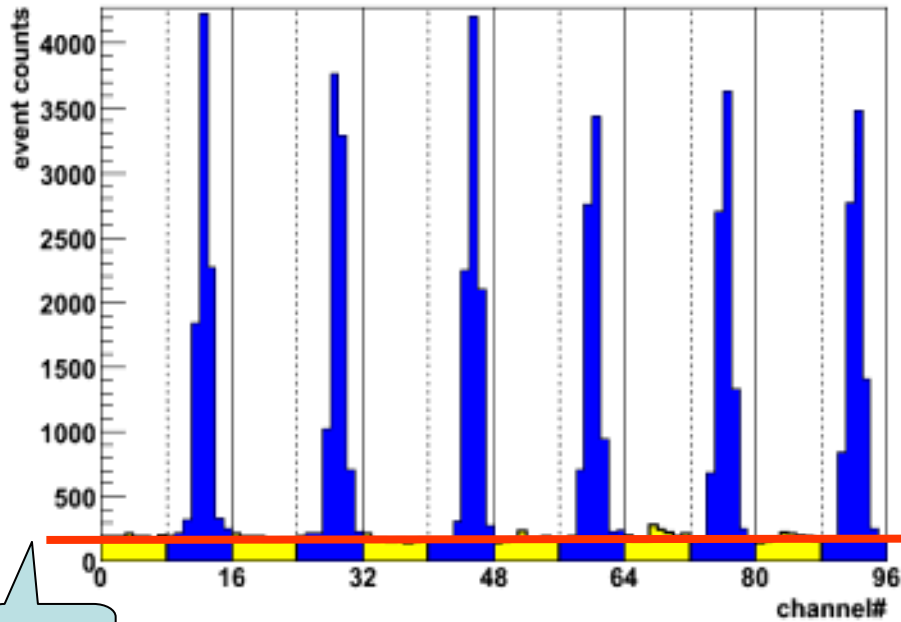
$$\text{Ch\#} \propto \theta_R$$

Forward
scattered
particle
identification

Background level single beam mode

$1.2 < T_R < 2.5$ MeV, 2 hours data

Event counts channel distribution $1200 < T_R < 2500$ kev



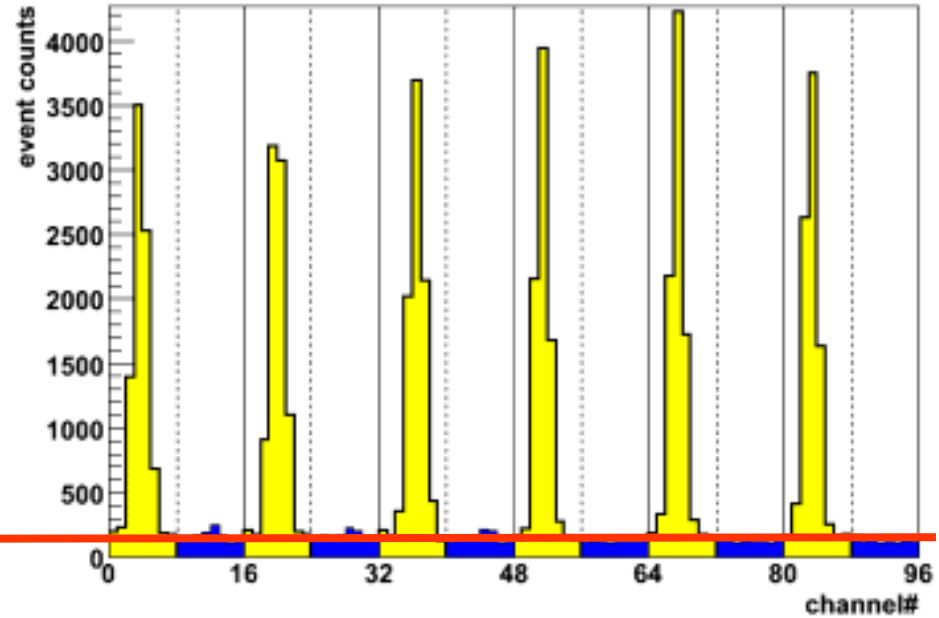
BLUE mode

BPM at IR12 reading:

Blue (x,y) = (0, -4)mm

Yellow (x,y) = (-10, +10)mm, Fill#9905

Event counts channel distribution $1200 < T_R < 2500$ kev



YELLOW mode

BPM at IR12 reading:

Blue (x,y) = (+5, +8)mm

Yellow (x,y) = (0, -4)mm, Fill#9920

ONLINE results of single beam mode

- ✓ Absolute beam-pol. for every couple of stores!

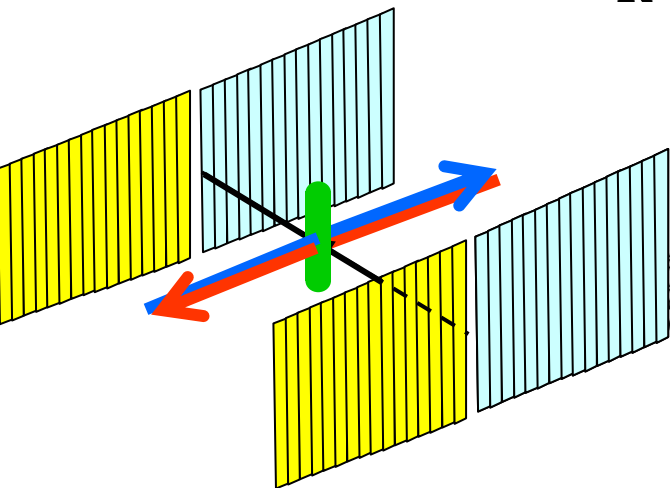
→ Sasha will show...

- ✓ All stuffs are available on the web.

<http://www.phenix.bnl.gov/WWW/publish/shura/RSC/2008/>

I am going to talk about brief update of
two beams mode commissioning.

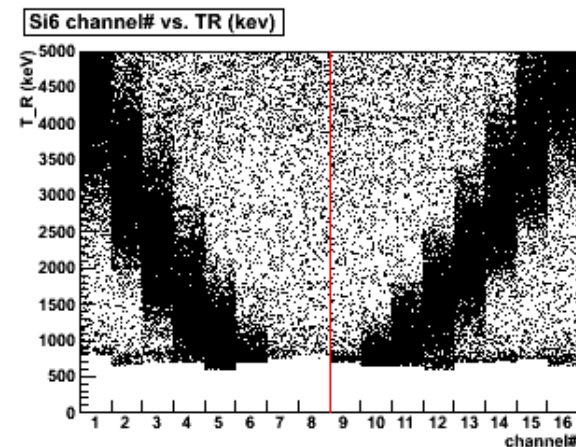
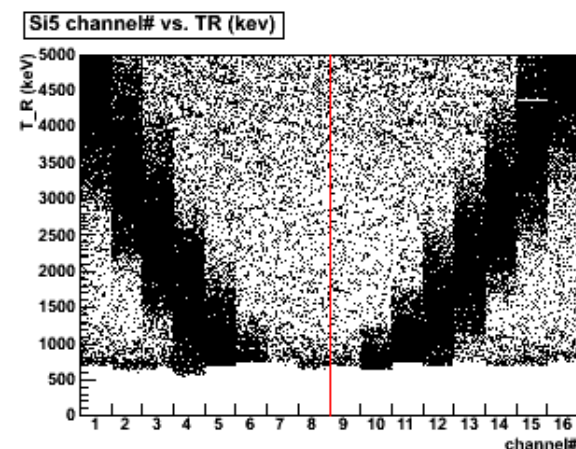
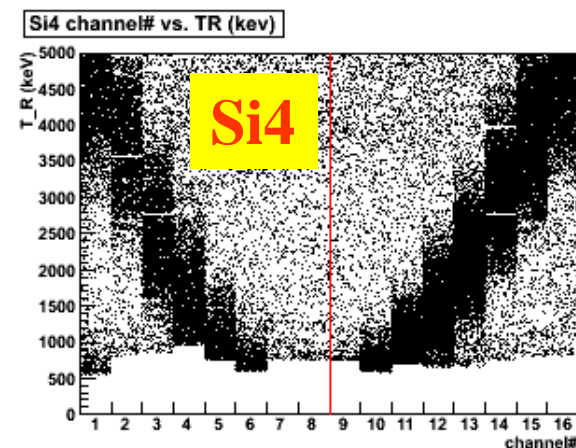
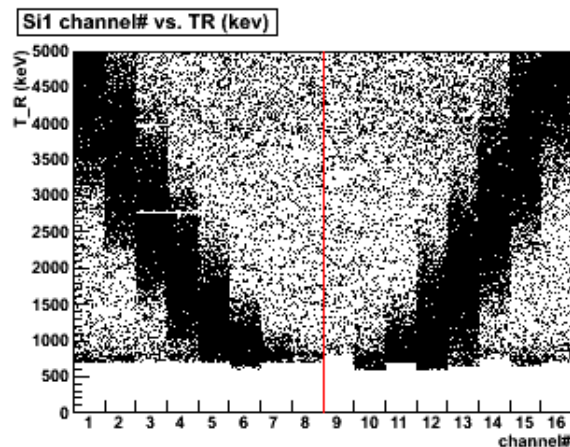
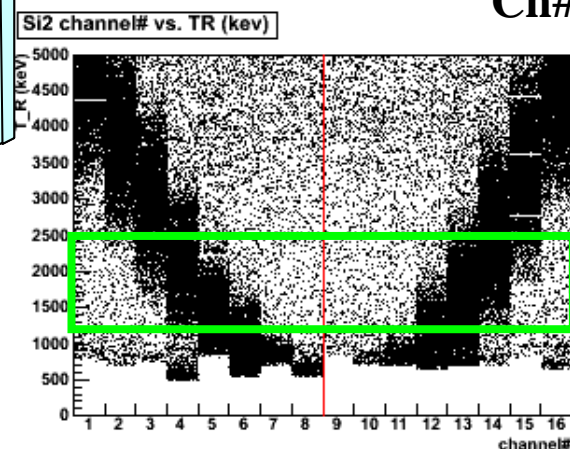
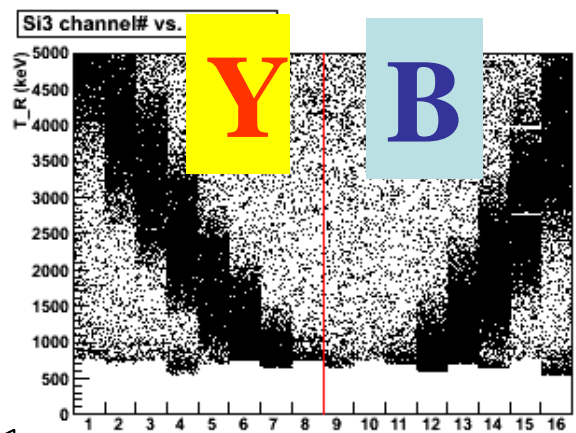
Two beams mode



T_R

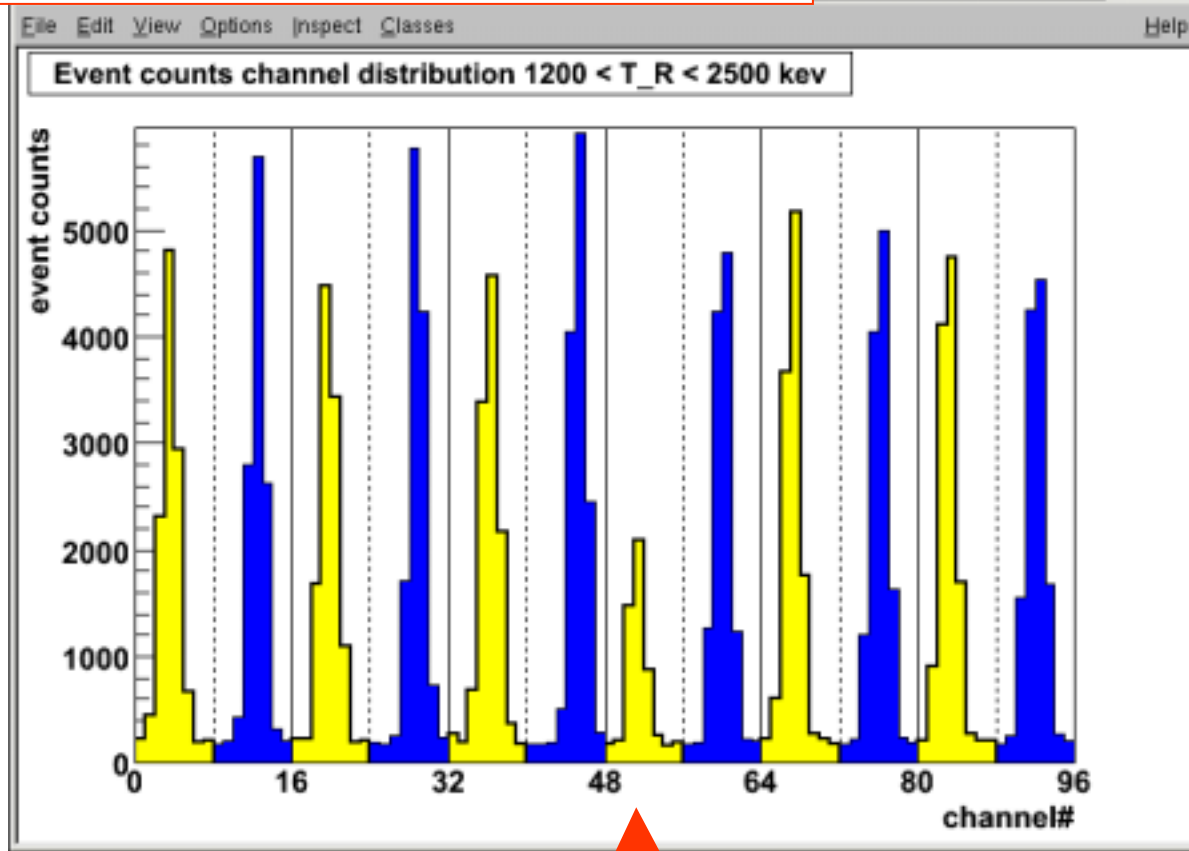
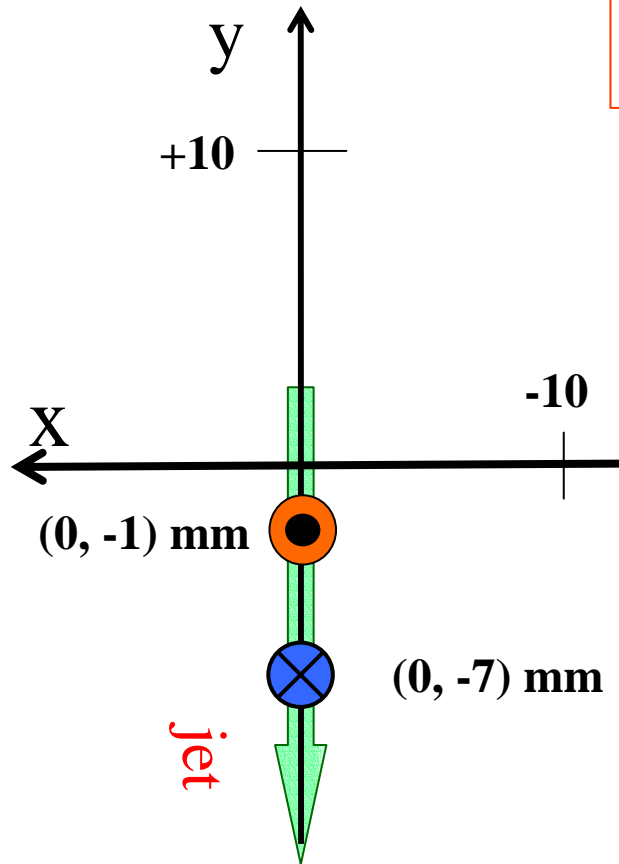
March 8-10,
20hours

T_R vs. θ_R



Event distribution of two beam mode $1.2 < T_R < 2.5$ MeV

Background level between blue and yellow do not differ!!



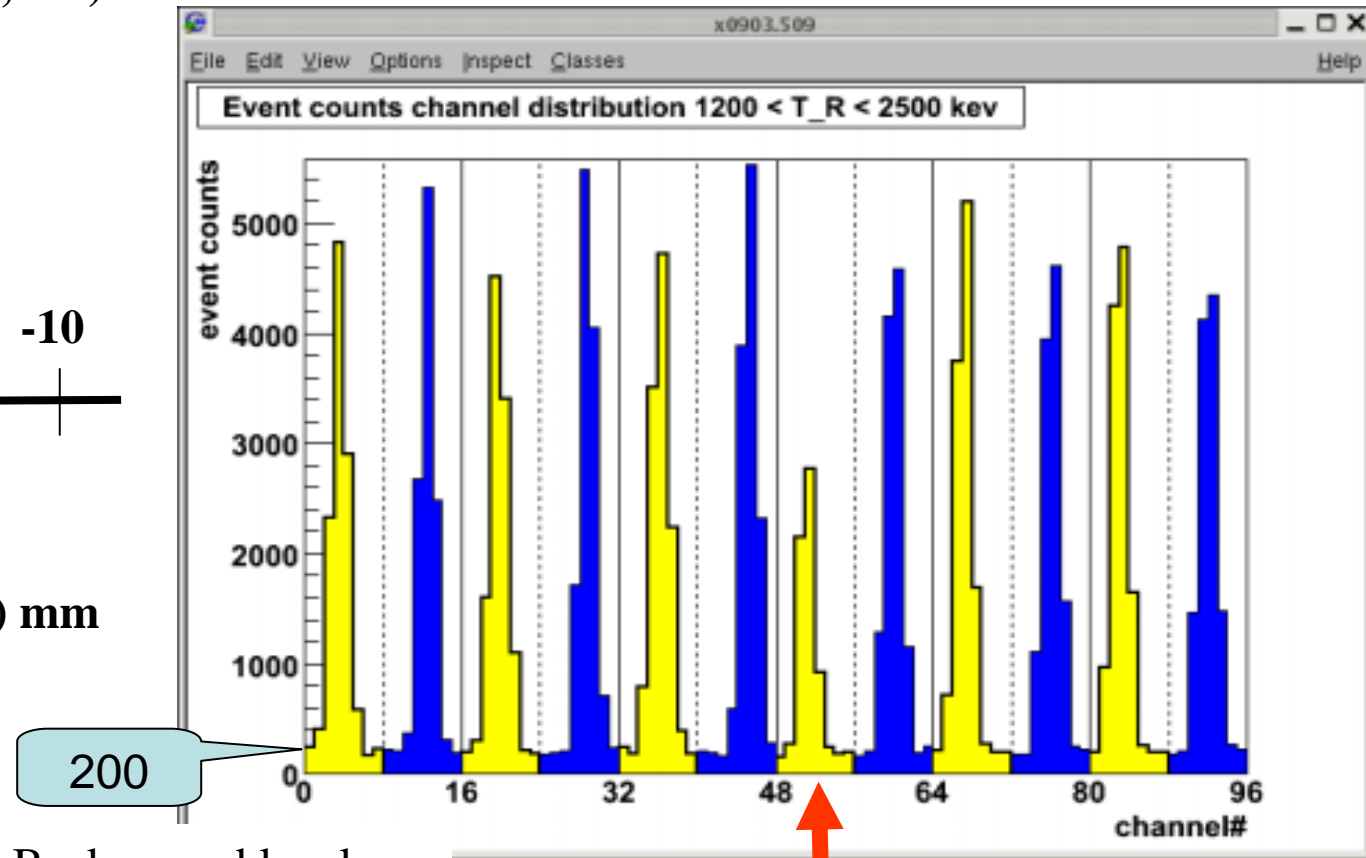
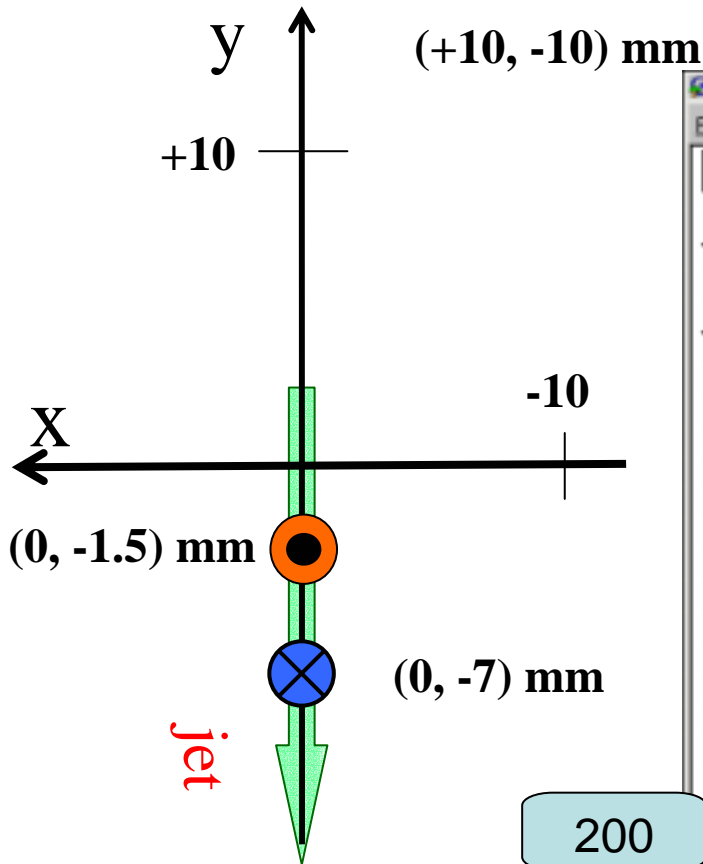
Two beams MODE

But, Si4 yellow side...

Two beams **MODE**

Blue beam down 0.5mm does help!

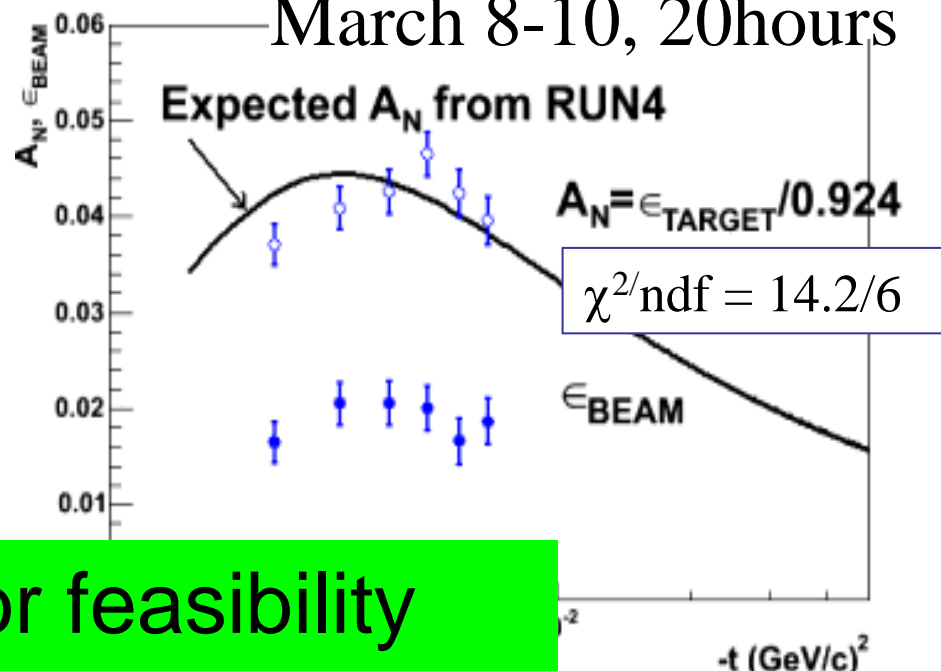
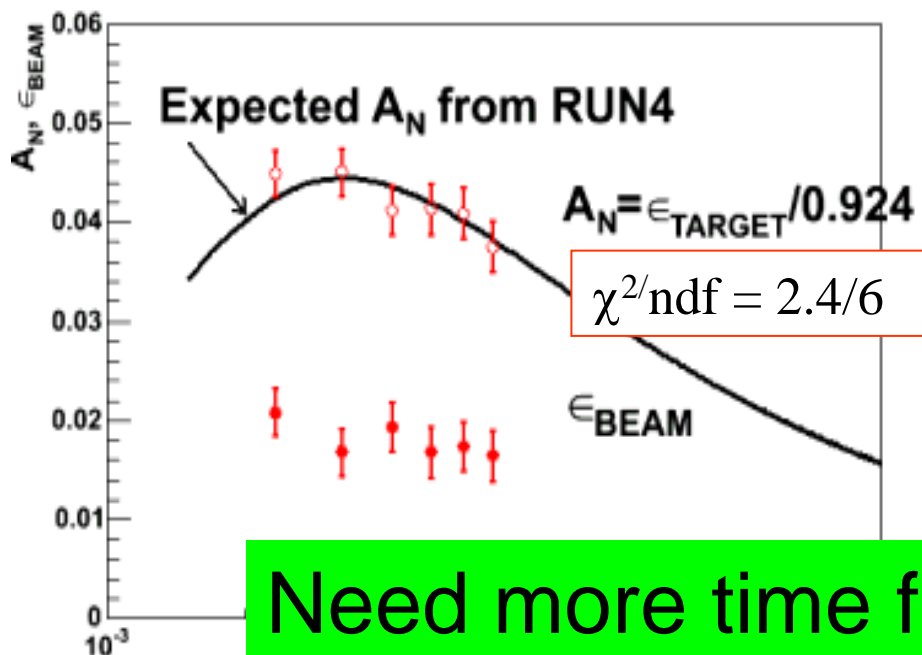
$1.2 < T_R < 2.5$ MeV, 2 hours data



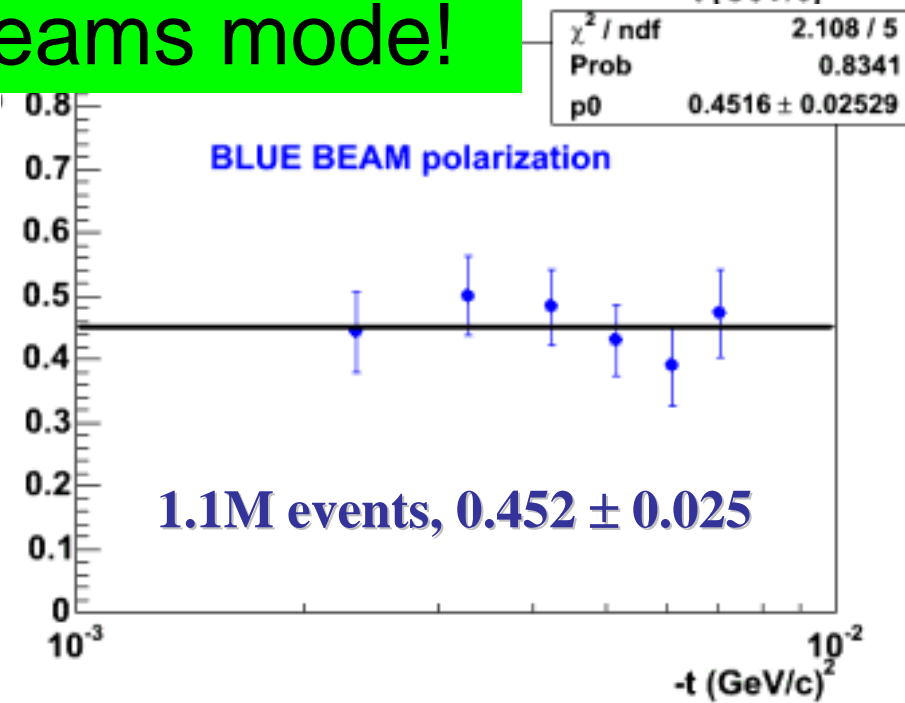
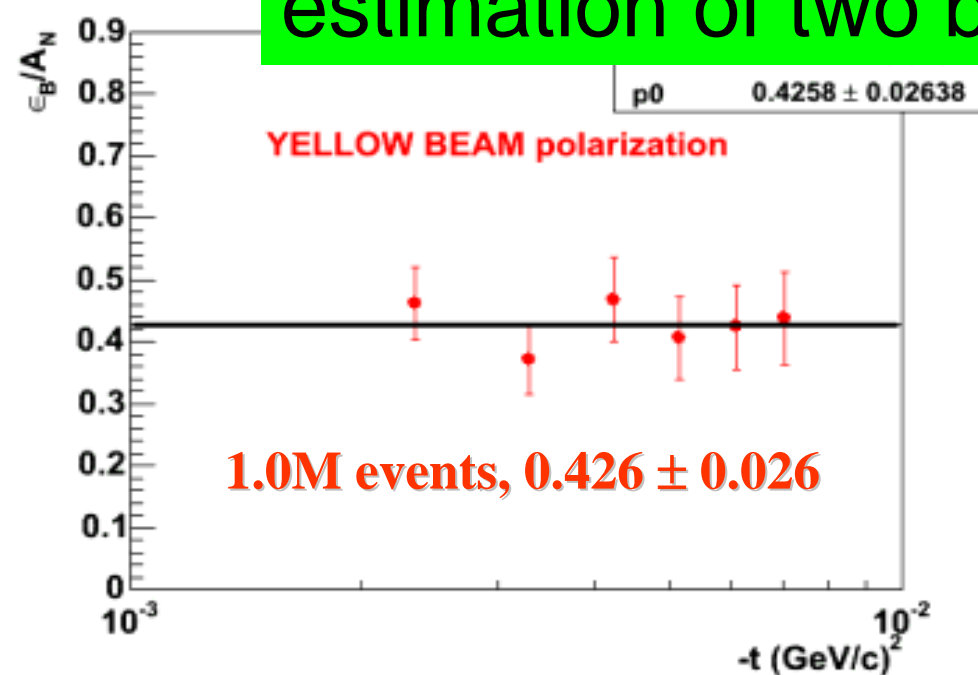
Background level
seems to be similar..?

Now, Si4 is better

March 8-10, 20hours



Need more time for feasibility estimation of two beams mode!



Next things...

❑ Offline analysis

- ✓ Time0 estimation to apply tighter TOF-width cut,
- ✓ Background level estimation,
- ✓ Acceptance study,
- ✓ More study of intensity profile of the H-Jet target,
- ✓ Check “polarization profile” of the H-Jet target using “off-center” data.

❑ Finalize results.

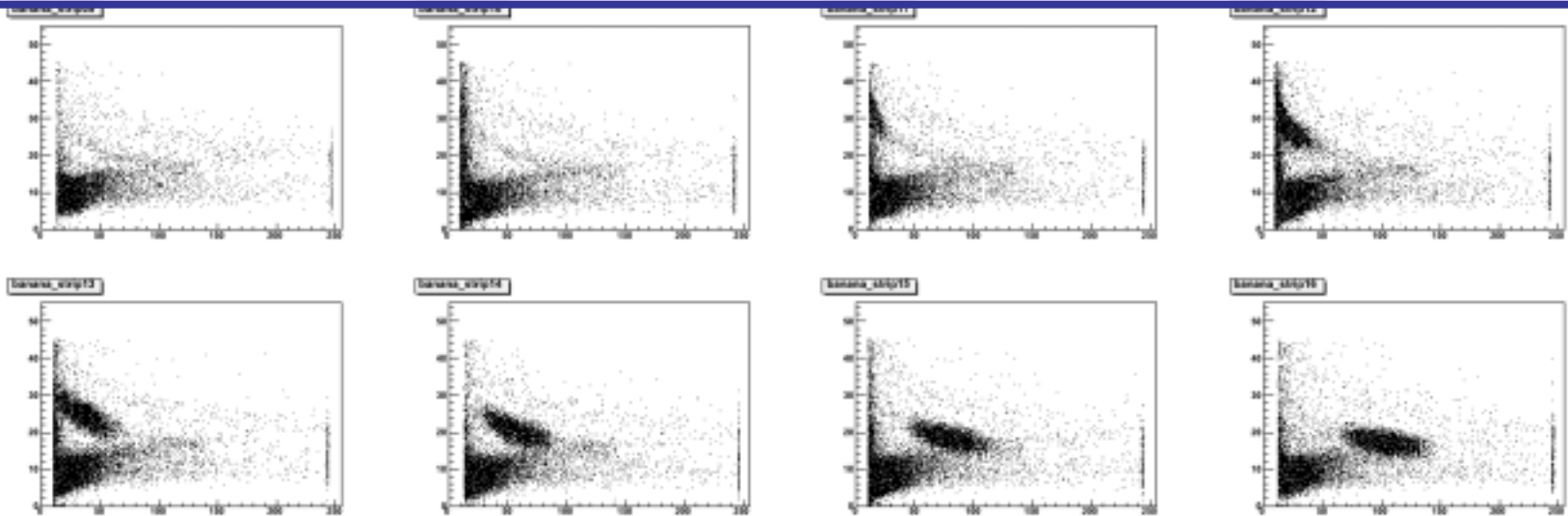
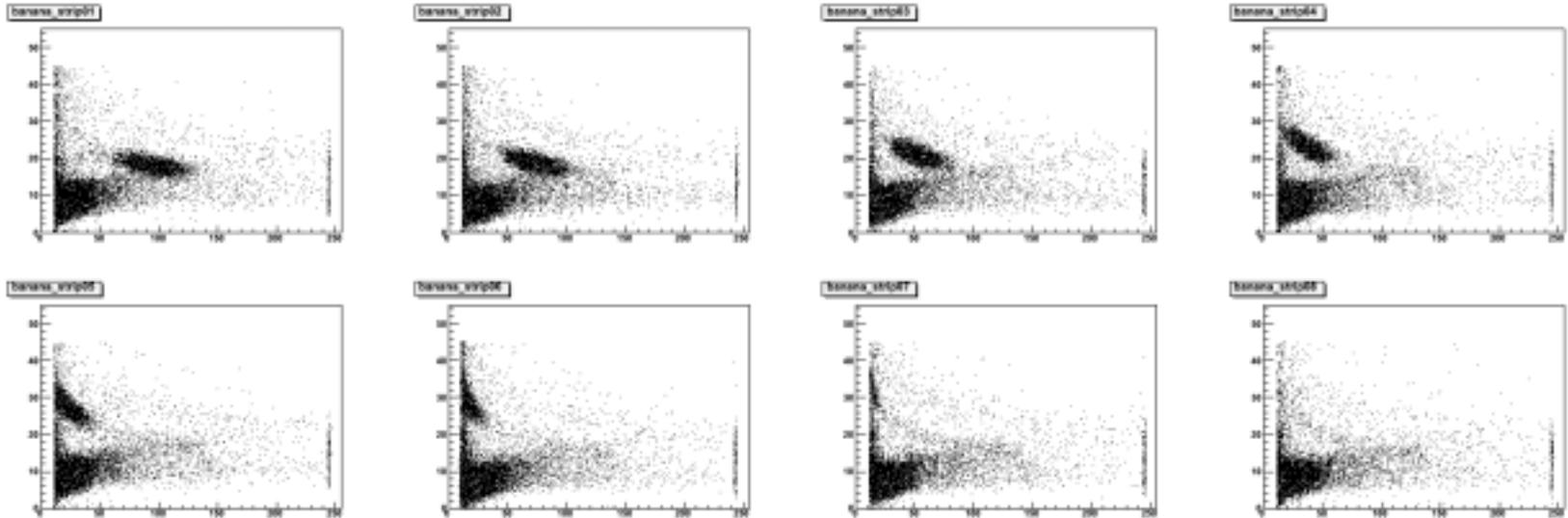
Do my best for the *offline* analysis!

Two beams mode

ADC vs. TDC

Si1

Run=4055,Ch4, Detector=4, Disc=105.17

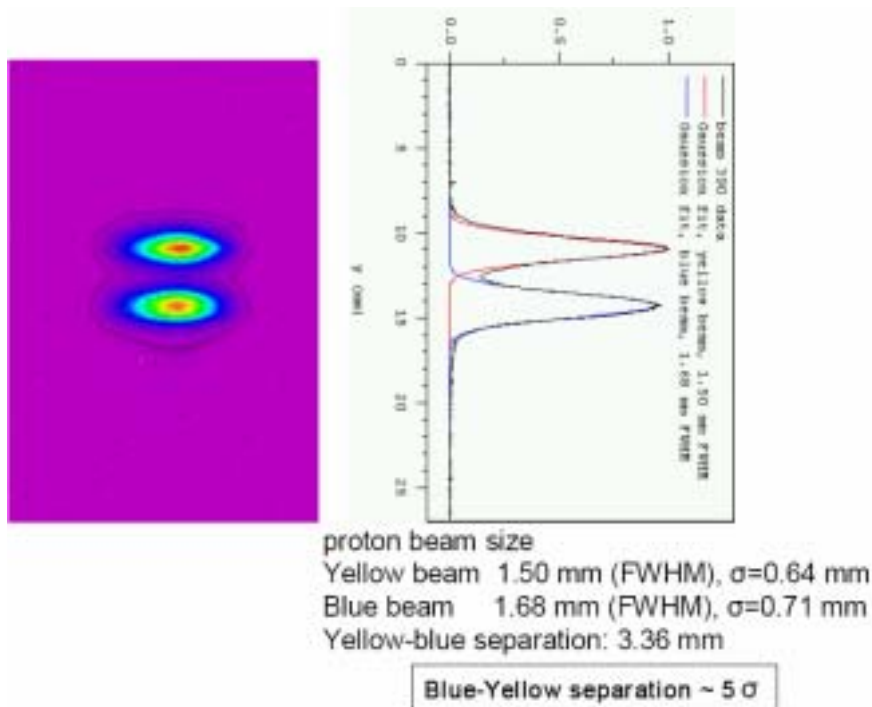


Two beams mode statistics

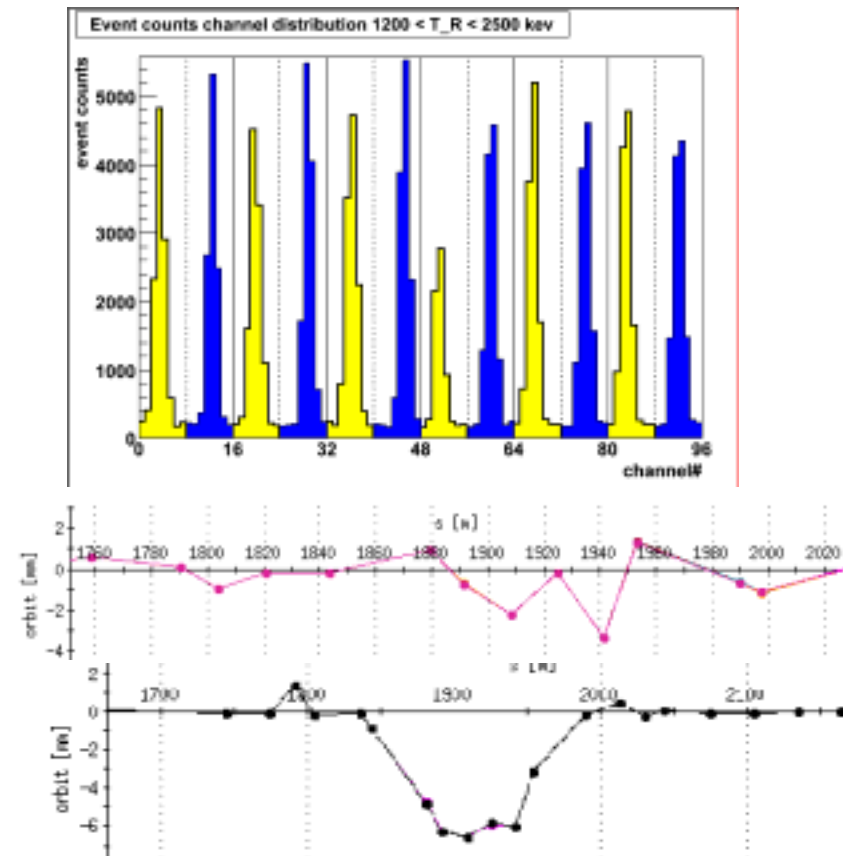
Fill#	Y-Events	$\langle P_{\text{YELLOW}} \rangle$	B-Events	$\langle P_{\text{BLUE}} \rangle$
9997	207624	-----	247692	-----
9998	372405	-----	416997	-----
10000	354350	-----	393737	-----
10002	56335	-----	71491	-----
total	990714	0.426 \pm 0.026	1129917	0.452 \pm 0.025

Yellow
position down
0.5mm

The Jet Running With Two Beams On Axis



$\beta_{Dx} = \beta^* + s^2 / \beta^* = 20\text{m}$ vs. 10 m
 Separation at IP is smaller by $1/\sqrt{2}$
 BPM 5.5mm \gg 3.88 mm Not bad !!



BPM data Y= -1.5, B= -7 mm
No beam decay or adverse backgrounds observed

Yousef's RHIC-retreat slide